

METHODS, APPARATUS AND COMPUTER PROGRAM PRODUCTS FOR MODELING THREE-DIMENSIONAL COLORED OBJECTS

Abstract of the Disclosure

Methods, apparatus and computer program products can generate light weight but highly realistic and accurate colored models of three-dimensional colored objects. The colored model may be generated from a second plurality of points that define a coarse digital representation of the surface and at least one texture map containing information derived from a first plurality of colored points that define a fine digital representation of the surface. This derivation is achieved by mapping points within the texture map to the fine digital representation of the three-dimensional surface. Colored scan data may be used to construct the fine digital representation as a triangulated surface (i.e., triangulation) using a wrapping operation. This triangulated surface may be a two-manifold with or without nonzero boundary and the colored scan data may constitute raw point data with each datum comprising three real numbers (x-,y-, z-coordinates) providing geometric information and three integer numbers (r-,g-,b-values) providing color information. Operations are then performed to create the coarse digital representation from the fine digital representation and also preferably create a plurality a texture maps from the fine and coarse digital representations. One map may contain color information and another map may recover geometric detail lost in the simplification process associated with generating the coarse digital representation from the fine digital representation. An additional map may also be generated that corrects for differences in directions of normal vectors associated with the coarse and fine digital representations.